Comments of

Communities for a Better Environment (CBE)

regarding

The "California Toxics Rule"

Proposed numeric criteria for priority toxic pollutants for California [FR 62(150)]

With special regard for public health and the environment of San Francisco Bay

September 24, 1997

CONTENTS

I. TOXIC POLLUTANTS THREATEN PUBLIC HEALTH AND SAN FRANCISCO BAY.

Toxic pollution causes harm in San Francisco Bay. Species of bivalve shellfish, plankton and phytoplankton that are especially vulnerable to toxic trace elements such as copper are decimated in its southern reach though they thrive in comparable estuaries with less metals pollution.[1,2] Mounting evidence suggests its sediment is toxic to some aquatic life.[3] Extensive research strongly suggests that PCBs and PAHs released to the Bay negatively effect reproduction in starry flounder.[4] Reproductive effects are also correlated with PCBs in Bay cormorant eggs. Bay harbor seals have PCBs levels twice those associated with immunotoxicity and a disease epidemic that decimated a European population of this species.[5] Health advisories are in effect because dioxin, PCBs, mercury, chlordane, DDT, dieldrin, and selenium contaminate Bay food resources eaten by the public.[6,7]

Public health threats from toxics in the food chain are of particular concern. A recent count found approximately 270,000 fishing licenses were issued to Bay Area residents. Surveys by CBE-SAFER!, the Save San Francisco Bay Association, and the Asian Pacific Environmental Network show that many people fish the Bay regularly to supplement their families' diet, that some people eat up to a maximum of a pound of fish per day, and that the majority of those who eat their catch regularly are people of color. (See attachment.[8]) A pound of fish per day is about 480 oz./month, sixty times the 8 oz./month "safety" cutoff for cancer and slow learning in the state's advisory.[6]

In addition to these severe environmental health and justice problems, pollutant monitoring of the Bay is far from comprehensive, and undetected problems are likely. Indeed, EPA acknowledged that designated uses of the Bay are threatened or impaired by toxic pollutants when it named the Bay as a "toxic hot spot" under Section 304(l) of the Clean Water Act.[9]

II. THE EPA PROPOSALS WILL NOT PROTECT FISHING AND OTHER USES OF SAN FRANCISCO BAY WATERS OR PROVIDE EQUAL PROTECTION FOR PEOPLE OF COLOR.

A. The criteria allow more pollution than prior technically-based criteria.

The proposed criteria would replace criteria found to be scientifically sound by the State Water Resources Control Board staff, adopted by the state, and approved by EPA, for San Francisco Bay in the 1991 California Bays and Estuaries Plan,[10] the 1986 San Francisco Bay Basin Plan,[11] and the Basin Plan amendment adopting the 1992 Site Specific Copper Objective for San Francisco Bay.[12] Table 1 compares the lowest concentration criteria for the 64 toxic pollutants identified by the San Francisco Estuary Project as "pollutants of concern" for the Bay.[13] The EPA criteria proposal:

- weakens environmental health protection for 37 of these 64 toxic pollutants (58%). It allows greater ambient water concentrations for 30 pollutants, includes new extremely liberal criteria for 4 of the 64 pollutants, and fails to replace previous state criteria for 3 pollutants.
- makes no change for 24 of these 64 pollutants (37%). It includes equivalent criteria for 6 pollutants, and includes no criteria for 18 pollutants which had no state-adopted criteria.
- improves criteria for only 3 of the 64 pollutants (5%). It includes new restrictive criteria for 2 pollutants, and proposes a criterion allowing 200,000 instead of 300,000 ug/L toluene.

Table 1. Summary comparison of the smallest numeric criteria proposed by EPA in the California Toxics Rule with those adopted for San Francisco Bay by California in the Bays and Estuaries Plan,[10] the 1986 Basin Plan,[11] and the Site-specific Copper Objective.[12] Compares the 64 "Pollutants of Concern" identified by the San Francisco Estuary Project.[13]

Pollutant	Lowest EPA v. Calif.
Toluene	Allows less (200,000 ug/L)
2,4,6-trichlorophenol	Allows more than
Anthracene	Allows more than
Arsenic	Allows more than
Benz(k)flouranthene	Allows more than
Benzene	Allows more than
Benzo(a)pyrene	Allows more than
Cadmium	Allows more than
Chlordane	Allows more than
Chromium	Allows more than
Chrysene	Allows more than
Copper	Allows more than
DDT	Allows more than
Dibenzo(a, h)anthracene	Allows more than
Dioxin	Allows more than
Endosulfan	Allows more than
Endrin	Allows more than
Fluoranthene	Allows more than
Fluorene	Allows more than
Heptachlor	Allows more than
Heptachlor epoxide	Allows more than
Hexachlorobenzene	Allows more than
Indeno(1,2,3-c,d)pyrene	Allows more than
Lead	Allows more than
Mercury	Allows more than
Nickel	Allows more than
PCBs	Allows more than
Pyrene	Allows more than
Silver	Allows more than
Toxaphene	Allows more than
Zinc	Allows more than
Benz(b)flouranthene	New, restrictive (49 ng/L)

Pollutant	Lowest EPA v. Calif.
Benzo(a)anthracene	New, restrictive (49 ng/L)
Acenapthene	New, liberal (2,700 ug/L)
Ehtylbenzene	New, liberal (29,000 ug/L)
Antimony	New, liberal (4,300 ug/L)
Hexachlorobutadiene	New, liberal (50 ug/L)
Selenium	No change from before
Aldrin	No change from before
Dieldrin	No change from before
B-hexachlorocyclohexane	No change from before
A-hexachlorocyclohexane	No change from before
Acenaphthylene	No criterion (was one)
G-hexachlorocyclohexane	No change from before
Phenanthrene	No criterion (was one)
Tributyl tin	No criterion (was one)
1-Methylnaphthalene	No criterion proposed
1-Methylphenanthrene	No criterion proposed
2,3,5-Trimethylphenanthrene	No criterion proposed
2,6-Dimethylnaphthalene	No criterion proposed
2-(4-morpholinyl)benzthiazole	No criterion proposed
2-Methylnaphthalene	No criterion proposed.
Benz(ghi)perylene	No criterion proposed
Benzo(e)pyrene	No criterion proposed
Benzthiazole	No criterion proposed
Chlorbenside	No criterion proposed
Cobalt	No criterion proposed
Dacthal	No criterion proposed
Malathion	No criterion proposed
Methoxychlor	No criterion proposed
Naphthalene	No criterion proposed
Parathion	No criterion proposed
Polychlorinated terphenyls	No criterion proposed
Xylene	No criterion proposed

The magnitude of increased pollutant concentrations allowed in Bay waters by EPA's proposal is estimated in Table 2. The first column in this table lists all the toxic pollutants for which EPA proposes more liberal criteria than those adopted by California for the Bay. Footnotes to this column further describe these pollutants. For example: dioxin includes 17 dioxin-like compounds included in the state criterion and current permit limits; and PAH includes the sum of 13 polycyclic aromatic hydrocarbons included in the state's PAH criterion and 8 of these compounds for which EPA proposes criteria.

The second column in Table 2 shows the lowest concentration criteria adopted by California for these pollutants in the Bay, with footnotes indicating the source of these criteria and whether they address human health or aquatic life. The third column shows the corresponding lowest concentration criteria for these pollutants proposed by EPA. Where the EPA-proposed criteria are expressed differently from the state criteria for a pollutant, calculations that more accurately compare the criteria are shown in footnote j to this column. These calculations fall into three general cases:

- Dioxin comparisons - California's dioxin criterion applies to 17 internationally recognized dioxin-like compounds, while EPA's proposal applies to 1 only, 2,3,7,8-TCDD. EPA's chief dioxin scientist and other international experts estimate that the other dioxins account for about 90% of environmental dioxin toxicity.[14] Thus, EPA's criteria value was multiplied by 10 to estimate the toxicity from California criteria dioxins at EPA's 2,3,7,8-TCDD value of 1.4 pg/100L. New data may change the 90% estimate, but not the finding that EPA's proposal is weaker.

- PAH comparisons - California's PAH criterion sums the amounts of 13 compounds, while EPA proposes individual criteria for only 8 of these 13 compounds. EPA criteria values for these 8 compounds were summed for comparison to California's 13-compound criterion. This approach underestimates the amount of PAH allowed by EPA's criteria by assuming a value of zero for each of the 5 compounds which lack EPA-proposed criteria.

- Total versus dissolved metals comparisons - California metals criteria are expressed as total metal while EPA's proposals are often expressed as dissolved metal. Ultra-clean measurements of Bay waters in 1989,[15] and 1995 (arsenic and chromium)[3] indicate that total concentrations are often much greater than dissolved concentrations for the same metal. For example, in 5% of Bay samples total copper is at least 3.5 times dissolved copper. At these times dissolved copper levels equal to EPA's 3.1 ug/L criterion correspond to total copper levels of 10.8 ug/L or greater. Ratios for other metals based on this 5% (95th percentile) analysis, which is used by EPA to prevent excursions above criteria more than once in 3 years, are shown in footnote j. Analysis of additional data may alter these ratios, but will not change the conclusion that EPA's proposed dissolved criteria will allow greater water concentrations than total metal criteria.

The estimated magnitude of increased pollutant concentrations allowed in Bay waters by EPA's proposed criteria is shown in the right-hand column of Table 2. EPA's proposal allows 430 million percent more PAH, 23,600% more lead, 3,900% more 1,4-dichlorobenzene, 910% more silver, 900% more dioxin, 630% more chlordane, 340% more DDT, 325% more mercury, 140% more PCBs and 120% more copper in the Bay as compared to state-adopted criteria, based on these estimates. Review of Table 2 also shows that allowable Bay water concentrations would double or more for 18 toxic pollutants in all.

Table 2. Estimated increase in toxic pollutant concentrations allowed in San Francisco Bay water by the smallest numeric criteria proposed by EPA in the California Toxics Rule, as compared with those adopted for the Bay by the State of California.

Pollutant	California	EPA proposal	Units (k)	% increase
Dioxin (a)	1.4 (g)	14 (j)	pg/100L	900
PCBS (b)	70 (g)	170	pg/L	140
Mercury	12 (g)	51	ng/L	325
Chlordane	81 (g)	590	pg/L	630
DDT (c)	0.6 (g)	2.6	ng/L	340
1,4-dichlorobenzene	64 (g)	2600	ug/L	3960
2,4,6-Trichlorophenol	1 (g)	2.1	ug/L	110
Benzene	21 (g)	71	ug/L	240
Fluoranthene	42 (g)	370	ug/L	780
Heptachlor	170 (g)	210	pg/L	24
Heptachlor epoxide	70 (g)	110	pg/L	57
Hexachlorobenzene	690 (g)	770	pg/L	12
Toxaphene	690 (g)	750	pg/L	9
Endrin (d)	0.8 (g)	1.5	ug/L	90
Sum of PAHs (e)	31 (g)	135000000 (j)	ng/L	430000000
Copper	4.9 (h)	10.8 (j)	ug/L	120
Silver	2.3 (h)	23.2 (j)	ug/L	910
Arsenic	36 (h)	58 (j)	ug/L	60
Lead	5.6 (h)	1328 (j)	ug/L	23600
Nickel	7.1 (h)	42 (j)	ug/L	490
Zinc	58 (h)	1660 (j)	ug/L	2760
Cadmium	9.3 (h)	18.6 (j)	ug/L	100
Chromium	50 (h)	8800 (j)	ug/L	17500
Endosulfan (f)	8.7 (i)	17.4	ng/L	100

a. Includes 17 dibenzo-para-dioxins and dibenzofurans chlorinated in the 2,3,7, and 8 positions.
b. Includes Arochlor 1016, 1221, 1232, 1242, 1248, 1254 and 1260 (& congeners/isomers - EPA).
c. Includes the sum of DDT, DDE and DDD.
d. Includes Endrin and Endrin aldehyde.
e. Includes 1,12-benzoperylene, 1,2-benzanthracene, 3,4-benzofluoranthene, acenaphthylene, phenanthrene, anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, indeno(1,2,3-c,d)pyrene and pyrene.
f. Includes endosulfan-apha and -beta and endosulfan sulfate.
g. Criteria for protection of human health adopted in the Bays & Estuaries Plan (Hg-IWP; Attach. 10).
h. Criteria for protection of aquatic life in S.F. Bay Basin Plan(Attach. 11; 12 for copper).
i. Criterion for protection of aquatic life adopted in the Bays & Estuaries Plan (Attach. 10).
j. EPA criteria values were calculated to allow comparison with state criteria values as follows: The EPA 2,3,7,8-TCDD criterion was multiplied by ten to account for the 16 other dioxins noted above which are not included in the EPA criterion and cause an estimated 90% of dioxin toxicity.[14] The EPA PAH value is the sum of the EPA criteria values for 8 PAHs included in EPA and state PAH criteria. EPA dissolved metals criteria were multiplied by the 95th percentile of the ratio of total/dissolved concentrations of each metal measured in the Bay using ultraclean methods.[3,15] These values for Cu, Ag, As, Pb, Ni, Zn, Cd and Cr were 3.5, 12.2, 1.6, 164, 5.1, 20.5, 2 and 176, respectively.
k. Concentration units. Time units (eg., duration of concentration exceeding criteria) are not compared.

In sum, comparison with the state criteria that would be replaced indicates that EPA's proposed criteria allow increased toxic pollution of San Francisco Bay by at least 37 toxic pollutants representing 58% of the pollutants of concern identified by the San Francisco Estuary Project, allow pollution to increase by about 1,000% or more for extremely toxic pollutants such as dioxin and PAH, and allow pollution to double or worse for 18 toxics including nearly all pollutants known to be of greatest concern in the Bay.

None of the state criteria which the EPA proposals are compared to were set aside because they are scientifically invalid. Rather, some of these criteria, which were adopted in the 1991 Bays and Estuaries Plan, were set aside by a state court on procedural grounds only,[12] and still form the basis for permit limits written by the state for the Bay.[21] EPA's proposed criteria allow toxic pollutant concentrations greater than those found by the state to be scientifically appropriate for protection of aquatic life and public health.

B. The criteria do not control pollution that harms fishing and aquatic life.

Adoption of EPA's proposed criteria values will result in less control of toxic pollutants that exceed state criteria values in large parts of San Francisco Bay. Examples of this problem are shown in tables 3 through 6 for mercury, copper, nickel and PAH measured in 1995 at monitoring stations shown on a map of San Francisco Bay (Figure 1). The EPA-proposed criteria would allow:

- mercury violations triggered by state criteria values through much of the northern reach of the Bay. EPA-proposed criteria trigger violations only at the Petaluma river mouth and in South Bay). Bay-wide, 8 of 15 state criteria-triggered violations (53%) are allowed by EPA criteria.

- copper violations triggered by state criteria (4.9 ug/L total) throughout the northern reach of the Bay. EPA's 3.1 ug/L dissolved value triggers violations only in the Petaluma river and in South Bay. Bay-wide, 15 of 25 state-triggered violations (60%) are allowed by EPA criteria.

- nickel violations triggered by state criteria throughout most of the northern and southern reaches of the Bay. EPA's 8.2 ug/L dissolved value triggers violations at the Petaluma river mouth and one South Bay slough. Bay-wide, 20 of the 22 water quality standards violations (91%) triggered by the 7.1 ug/L criterion are allowed by EPA criteria.

- PAH violations triggered by state criteria at Coyote Creek and the Petaluma River mouth. EPA-proposed criteria trigger 4 violations for benzo(a)pyrene and indeno(1,2,3-cd)pyrene while state criteria trigger 40 violations for these compounds and 6 other PAHs.

Though EPA criteria do not control mercury except at the Petaluma River and in South Bay, a state human health advisory cites mercury contamination,[6] and demonstrates that mercury restricts fishing uses Bay-wide. A severe threat and possible harm to aquatic life of the Bay's entire southern reach is evidenced by reduced abundance of all species known to be most vulnerable to copper toxicity, while these same species thrive in otherwise similar estuaries with less copper and nickel pollution.[1,2] EPA criteria do not control copper and nickel in most of this area. Nor do EPA criteria control PAHs which -- with PCBs -- cause toxic effects in starry flounder in Central Bay.[4]

Further, EPA's proposed criteria include no criteria for 16 dioxin compounds that are included

Table 3. Mercury would be less controlled in San Francisco Bay waters by EPA proposed criteria, as compared with California criteria. Shows data from monitoring stations that exceeded criteria in 1995 (Sources: attachments 3 and 10.)

Station	Date	Total mercury (ug/L)	Old mercury exceed criteria? State	EPA (0.05)
Petaluma River	2/13/95	0.0410	yes	no
Petaluma River	8/21/95	0.0363	yes	no
Grizzly Bay	4/20/95	0.0299	yes	no
Hooker Bay	4/20/95	0.0440	yes	no
San Pablo Bay	4/19/95	0.0435	yes	no
Davis Point	4/19/95	0.0361	yes	no
Dumbarton Br.	8/15/95	0.0262	yes	no
South Bay	4/25/95	0.0291	yes	no
Petaluma River	4/19/95	0.0793	yes	yes
Dumbarton Br.	4/24/95	0.0682	yes	yes
Coyote Creek	4/24/95	0.1030	yes	yes
San Jose	4/25/95	0.0909	yes	yes
San Jose	8/14/95	0.1030	yes	yes
Sunnyvale	4/25/95	0.0566	yes	yes
Sunnyvale	8/14/95	0.1018	yes	yes

Table 4. Copper would be less controlled in San Francisco Bay waters by EPA proposed criteria, as compared with California criteria. Shows data from monitoring stations that exceeded the state 4.9 ug/L total, and/or EPA 3.1 ug/L dissolved copper criteria in 1995 (Sources: attachments 3 and 12.)

Station	Date	Total copper (ug/L)	Dissolved copper (ug/L)	Exceed criteria? State / EPA
Petaluma River	8/21/95	6.57	2.63	yes / no
Grizzly Bay	2/14/95	4.95	1.83	yes / no
Grizzly Bay	4/20/95	9.85	1.66	yes / no
Hooker Bay	2/14/95	4.91	1.35	yes / no
Hooker Bay	4/20/95	5.39	1.78	yes / no
Napa River	2/14/95	5.34	1.96	yes / no
Napa River	4/18/95	6.49	1.43	yes / no
San Pablo Bay	4/19/95	10.04	1.55	yes / no
Pacheco Creek	2/14/95	5.68	1.99	yes / no
Pacheco Creek	4/20/95	5.10	1.49	yes / no
Davis Point	2/13/95	7.53	1.93	yes / no
Davis Point	4/19/95	10.16	1.41	yes / no
Pinole Point	4/20/95	5.46	1.37	yes / no
Dumbarton Br.	4/24/95	7.19	2.80	yes / no
South Bay	4/25/95	5.61	2.89	yes / no
Petaluma River	2/13/95	8.96	3.41	yes / yes
Petaluma River	4/19/95	15.28	4.77	yes / yes
Dumbarton Br.	8/15/95	5.20	3.74	yes / yes
South Bay	8/15/95	5.47	4.37	yes / yes
Coyote Creek	4/24/95	11.79	4.29	yes / yes
Coyote Creek	8/14/95	5.13	4.13	yes / yes
San Jose	2/3/95	4.86	3.48	no / yes
San Jose	4/25/95	10.68	4.05	yes / yes
San Jose	8/14/95	10.74	3.87	yes / yes
Sunnyvale	4/25/95	7.66	4.04	yes / yes
Sunnyvale	8/14/95	11.13	4.29	yes / yes

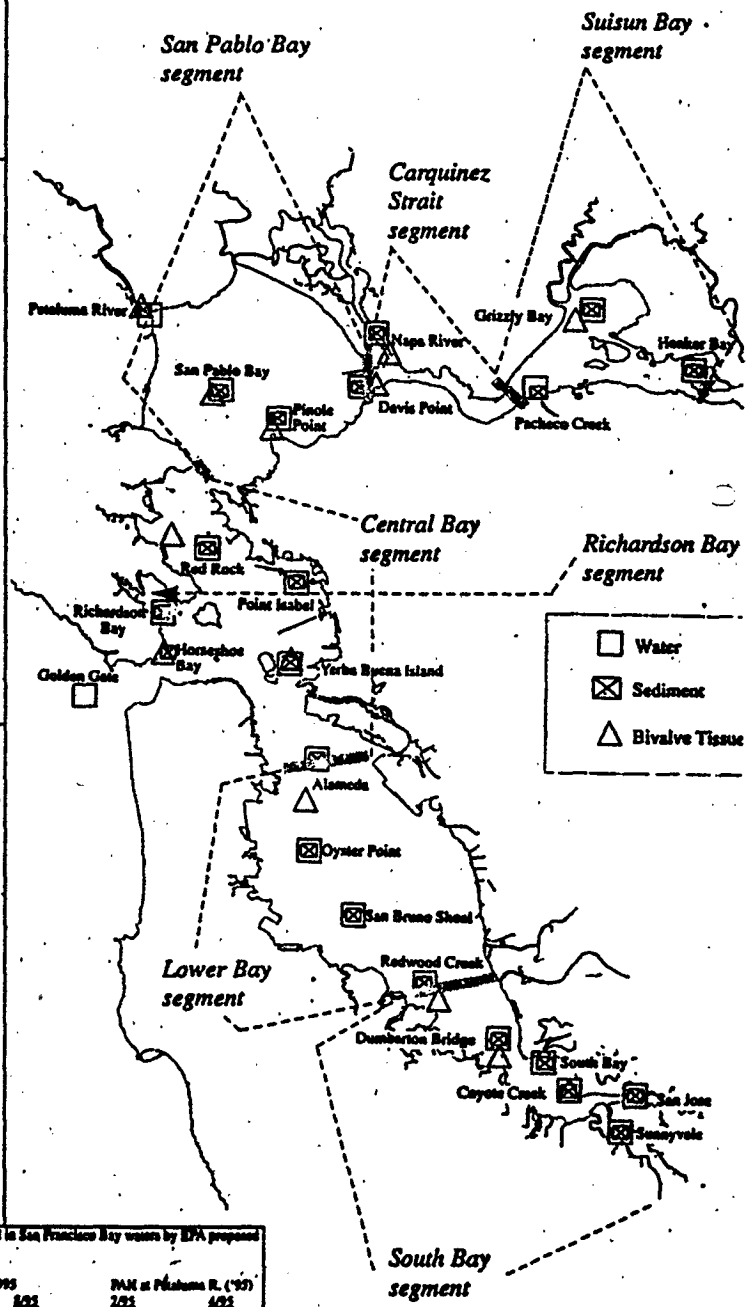
Table 5. Nickel would be less controlled in San Francisco Bay waters by EPA proposed criteria, as compared with California criteria. Shows data from monitoring stations that exceeded the state 7.1 ug/L total, and/or EPA 8.2 ug/L dissolved nickel criteria in 1995 (Sources: attachments 3 and 11.)

Station	Date	Total nickel (ug/L)	Dissolved nickel (ug/L)	Exceed criteria? State / EPA
Petaluma River	4/19/95	33.23	8.07	yes / no
Petaluma River	8/21/95	8.93	2.74	yes / no
Grizzly Bay	4/20/95	13.66	1.35	yes / no
Napa River	2/14/95	8.85	2.14	yes / no
Napa River	4/18/95	7.94	1.23	yes / no
San Pablo Bay	4/19/95	18.36	1.69	yes / no
Pacheco Creek	2/14/95	7.77	1.48	yes / no
Davis Point	2/13/95	12.34	2.22	yes / no
Davis Point	4/19/95	15.69	1.75	yes / no
Pinole Point	4/20/95	9.81	1.22	yes / no
Dumbarton Br.	4/24/95	13.85	2.88	yes / no
Dumbarton Br.	8/15/95	7.96	3.35	yes / no
South Bay	4/25/95	9.06	3.10	yes / no
South Bay	8/15/95	7.55	4.41	yes / no
Coyote Creek	2/3/95	8.29	4.30	yes / no
Coyote Creek	4/24/95	22.31	4.74	yes / no
San Jose	2/3/95	11.13	7.72	yes / no
San Jose	4/25/95	22.67	6.83	yes / no
Sunnyvale	4/25/95	11.81	3.68	yes / no
Sunnyvale	8/14/95	23.47	6.12	yes / no
Petaluma River	2/13/95	21.80	9.45	yes / yes
San Jose	8/14/95	23.70	10.94	yes / yes

Table 6. Polycyclic aromatic hydrocarbons (PAH) compounds would be less controlled in San Francisco Bay waters by EPA proposed criteria, as compared with California criteria. (Sources: attachments 3 and 10.)

PAH compound (units in ng/L)	PAH Criteria Calif.	EPA	PAH at Coyote Creek water in 1995 2/95	4/95	8/95	PAH at Petaluma R. ('93) 2/93	4/93
Anthracene		110000000000	92	2200	73	350	4100
Phenanthrene		–	2320	13940	4300	3170	24300
Chrysene		49000	3390	17430	5140	5263	30055
Pyrene		11000000000	11200	57150	7900	13230	90017
Benzo(a)pyrene		49000	2300	54000	10	9600	51000
Benzo(k)fluoranthene		49000	4400	25320	3995	9000	22000
Dibenz(a,h)anthracene		49000	1430	11130	1100	1830	8300
Indeno(1,2,3-cd)pyrene		49000	13730	93950	10000	16730	75000
Sum of these PAHs	31000	—	40000	277000	32000	59000	295000
Number of these PAHs above EPA criteria			0	2	0	0	2
Number of these above California criteria			5	5	5	5	5

Figure 1. Map of San Francisco Bay showing monitoring stations sampled in 1995 by the Regional Monitoring Program, and segmentation of water bodies.
(See attachments 3 and 11.)



in the state dioxin criterion for TCDD equivalents.[10, 21] These 16 compounds are 6 dibenzo-para-dioxins chlorinated in the 2,3,7, and 8 positions (except for 2,3,7,8-TCDD which is included in the EPA criterion), and 10 dibenzofurans chlorinated in the 2,3,7 and 8 positions. Under the state criteria, these 16 compounds and 2,3,7,8-TCDD are assigned toxicity equivalence factors as discussed in the proposed rule. Under the state criterion all these compounds are limited: if only 2,3,7,8-TCDD is present it cannot exceed 0.014 pg/L; if only OCDD is present it cannot exceed 14 pg/L; and if a mixture of dioxins is present the sum of their toxicities cannot exceed 0.014 pg/L. By failing to use toxicity equivalents and then failing to propose separate criteria for these 16 compounds, EPA is essentially deregulating 16 of the most toxic chemicals known to science even though these dioxins harm fishing uses, as shown by the health advisory discussed above.[6]

The EPA criteria do not control toxics that threaten and harm the Bay, fishing and public health.

C. Criteria for the pollutants of most concern do not provide equal protection for people of color and are not supportable by science.

EPA cannot show that its weaker proposed criteria will protect fishing and aquatic life from dioxin-like compounds, mercury, and copper. Further, EPA's proposal to allow greater health risks for subsistence fishers fails to provide equal protection under the law and is contrary to the President's Executive Order on Environmental Justice.

The proposed criteria provide unequal protection for people of color who fish for food. EPA admits in the proposal that: "There may be subpopulations within a state, such as subsistence anglers who as a result of greater exposure to a contaminant, are at greater risk than the hypothetical 70 kilogram person eating 6.5 grams per day of maximally contaminated fish.. ." Indeed, ample data show that some people exercise their fishing rights to "use" Bay waters by eating up to a pound (450 grams) per day of fish from San Francisco Bay, and most of them are people of color.[8] EPA's discussion then goes on to admit that it is proposing to provide less protection for these subsistence anglers: "[I]ndividuals that ingest ten times more of a carcinogenic pollutant than is assumed in derivation of the criteria at a [one excess cancer in a million] risk level will be protected to a [one in 100,000] level, which EPA has historically considered to be adequately protective." However, people who eat a pound per day eat seventy times more, and pages 8-11 and 8-12 of EPA's economic analysis admit people eat 16 times more, than the 6.5 grams (1/70th of a pound) of Bay fish per day assumed in EPA's criteria. EPA's own calculations show present cancer threats of nearly 1 in 1,000 for some Bay anglers at these higher consumption levels. Thus, EPA itself predicts that its proposal will result in lesser, inadequate protection for people of color who rely on Bay-caught fish for food.

EPA unscientifically rejects criteria for 16 dioxin-like chemicals that impair San Francisco Bay. The 16 dioxin compounds that are not controlled by EPA's proposed criteria cause 80% of dioxin-like toxicity in San Francisco Bay fish tests supporting the human health advisory noted above.[20] Subtracting all 2,3,7,8-TCDD toxicity does not change these dioxin-like toxicity estimates enough to reverse the conclusions which support this advisory.[20, 16] Thus, these 16 compounds impair fishing uses in San Francisco Bay. A criterion which includes the 16 dioxins developed by the state was approved in EPA's prior technical review, and the discussion in EPA's proposal shows that EPA still believes this criterion is scientifically defensible. Therefore, EPA's rejection of a criterion it believes is scientifically sound renders EPA's refusal to include criteria needed to protect San Francisco Bay fishing from these 16 dioxin-like chemicals without any valid scientific support.

Proposed mercury criteria ignore the concentration of mercury in the food chain and site-specific field data in a scientifically insupportable manner. One reason EPA's criterion allows mercury to harm Bay fishing, as shown above, is that EPA's proposed "bioconcentration factor" predicts that 1 part per trillion (ppt) of mercury in water results in 7,374 ppt in fish eaten by the public. EPA rejected "bioaccumulation factors" from the Great Lakes which predict that the same 1 ppt in water results in 27,900 to 140,000 ppt mercury in fish eaten by the public. This decision weakens the criterion drastically by ignoring mercury's most dangerous aquatic property.

EPA's rejection of data on mercury concentration in the aquatic food chain is scientifically insupportable. The fact that mercury concentrates strongly in aquatic food chains is beyond dispute. However, EPA's bioconcentration factor includes data on the "uptake and retention of a substance from water only." EPA's criterion thus fails to protect against human exposure to all mercury that gets into fish from the food the fish eat, which comprises most of this human mercury exposure. (The statement that EPA's "PBCFs take into account uptake from food as well as water" appears to mean food and water consumption by humans, and should not be read to obfuscate this problem.)

EPA's rationale for rejecting mercury bioaccumulation data for protection of San Francisco Bay is incorrect. The proposal states that: "Lacking the data, it is difficult to determine if the [bioaccumulation factors] used in the [Great Lakes Initiative] represent the potential for mercury bioaccumulation in surface waters in California." However, numerous high quality field measurements of San Francisco Bay water and fish eaten by the public demonstrate mercury bioaccumulation comparable with Great Lakes estimates and far greater than EPA's "bioconcentration factor."[3, 16] These data are summarized in Table 7. It is unscientific to ignore high quality, consistent field data showing mercury concentration in aquatic food webs while proposing a criterion which allows harm to fishing.

Table 7. Mercury bioaccumulation field-measured in San Francisco Bay as compared to bioaccumulation factors developed by the Great Lakes Initiative, and EPA's proposed "weighted average practical bioconcentration factor" (BCF). S.F. Bay data from attachments 3 and 16.

	Tissue ppb (median)	Water ppb (median)	Bioaccumulation factor	Percent of EPA BCF (EPA BCF = 7343)
San Francisco Bay-wide				
25 striped bass v. 65 water tests	257	0.0093	28000	380
130 white croaker v. 65 water tests	130	0.0093	14000	190
35 sharks v. 65 water tests	594	0.0093	64000	870
S.F. Bay segment w. largest sample				
13 st. bass v. 15 water tests (So. Bay)	238	0.0262	9100	120
55 croaker v. 11 water tests (C. Bay)	93	0.003	31000	420
14 sharks v. 11 water tests (C. Bay)	617	0.003	206000	2800
Great Lakes Initiative BAFs				
trophic level 3 fish			27900	380
trophic level 4 fish			140000	1900

Proposed copper criteria ignore San Francisco Bay data that show damage to sensitive populations at lower dissolved copper concentrations and led the state to reject criteria that deregulate total copper in its water quality criteria. The proposed rule states that: "New data including data collected from studies for the New York/New Jersey Harbor and the San Francisco Bay indicated a need to revise the copper criteria documents to reflect a change in the saltwater" criteria. In contrast to this statement, many scientists involved in review of the San Francisco Bay study reached a very different conclusion.

Many scientists commented during the state's review that the data did not necessarily support a revised copper criterion. EPA scientists raised many questions regarding: inadequate seasonal sampling; departure from standard testing recommendations; interpretation of toxicity test endpoints and precision; interpretation of widely varying responses; failure to measure dissolved copper in key bioassays and sites; overestimation of the amount of copper producing an effect; significant problems with algal test interpretation; confusion of acute versus chronic exposure; unmeasured effects of filtration; joint toxicity of copper with other metals; multiple stresses; bioaccumulation; and, generally, how lab results will "mimic environmental reality."[17]

Other scientists stated similar and stronger concerns. Dr. Michael Perrone commented that "there isn't a positive demonstration that dissolved copper is a good predictor" of environmental protection.[18] The state's Department of Fish and Game also stated that "[t]otal copper can become unbound and available for uptake by organisms" in comments voicing many of the concerns listed above, and recommended: "Retain the existing criteria of 2.9 ug/L as total copper."[19]

The weight of scientific opinion raised sufficient questions about how these laboratory studies "mimic environmental reality" to warrant analysis of field data. This showed species had responded to changes in Bay copper, and those bivalve shellfish and phytoplankton which are most vulnerable to copper toxicity were severely reduced in abundance although they once thrived here, and thrive in similar estuaries at dissolved copper levels of about 1 ug/L or less.[1] Comparison of high quality data between estuaries further demonstrated S.F. Bay copper pollution similar to other polluted estuaries, and dissolved copper levels below 1 ug/L in unpolluted or less polluted estuaries where these copper-sensitive species thrive.[2] There is a "reasonable probability" that copper levels in waters of the southern reach affect the ecosystem, and cutting copper pollution will likely benefit aquatic life.[1]

Therefore, the state's review of all of this evidence led to a decision to adopt a criterion for total copper that would require reduced copper concentrations. The fundamental rationale for this was that cutting copper pollution was necessary in order to ensure the protection of aquatic life. In contrast, EPA's proposed 3.1 ug/L dissolved copper criterion, which would not require less copper in most Bay waters as shown in Table 4, and which allows dissolved copper three times levels at which sensitive estuarine species are known to thrive, cannot ensure the protection of Bay aquatic life based on sound scientific rationale.

D. EPA's proposals fail to meet federal laws and regulations.

Proposed criteria would revise water quality standards contrary to law and regulations. Pursuant to 40 CFR §131.22(c) revised water quality criteria must protect existing uses under 40 CFR §131.12 (a)(1), and shall support the most sensitive designated use of Bay waters based on sound scientific rationale, under 40 CFR 131.11(a)(1). However, EPA criteria for pollutants shown in Table 2 above do not meet these tests, as shown by sections II A, B, and C of these comments.

Inappropriate rejection of scientifically sound criteria for 16 dioxin compounds, mercury bioaccumulation, and mercury and copper field data results in criteria which allow pollutant levels shown to threaten or harm aquatic life and the fishing public. Human health criteria do not protect people who eat up to a pound of Bay fish per day because EPA assumes people eat only 6.5 grams of these fish per day. In this crucial analysis, protecting the most sensitive use must mean protecting people who eat as much as a pound of fish per day (seventy times more than 6.5 grams), and more often than not are people of color fishing for food as well as recreation.[8] The criteria do not protect designated uses of Bay waters for fishing and propagation of aquatic life based on sound science.

Even if EPA argues that some of the pollutants for which it proposes weaker criteria attain levels necessary to achieve water quality standards and protect fishing, aquatic life and wildlife, under 40 CFR 131.12(a)(2) EPA cannot allow water quality to be degraded because this is not "necessary to accommodate important economic or social development." At EPA's request, CBE has supplied evidence showing that long-term economic benefits to the manufacturing base resulted from pollution prevention measures driven by the implementation of state criteria more stringent than EPA's proposal with zero dilution effluent limits. The economy of this area, Silicon Valley, grew substantially at the same time and this growth was led by the industries involved in this effort. Although we are concerned that EPA seems to have arbitrarily rejected evidence that the most "stringent" criteria implementation resulted in economic benefit rather than cost, we trust EPA will agree there is no evidence that weakening these criteria is needed for economic or social reasons.

The proposed implementation plan allowing compliance schedules for effluent limits to attain the criteria to be placed in permits may not pass the antidegradation test either. CBE believes EPA recognizes that permit schedules which allow continued impairment of fishing and aquatic life uses are improper (See eg., §1311(b)(1)(C), §1314(*l*)(1)(D), §1342(o)(1) and (3) and §1313(d)(4)(A) of the Clean Water Act). In the alternative case, however, a schedule allowing discharge of these persistent pollutants to waters attaining the criteria will result in the accumulation of pollutants and will degrade water quality. This degradation is unnecessary as the state has accommodated important economic and social development for years while placing compliance schedules in administrative enforcement orders, and is thus impermissible under 40 CFR §131.12(a)(2). Indeed, existing California dischargers have been made aware of the need to meet similar or more restrictive criteria since at least 1991, and further extension of time for more pollution should be done through schedules in enforcement orders. Any desire to avoid the administrative effort of continuing to prepare these enforcement orders is easily outweighed by the public interests in clean water and public participation afforded.

In sum, EPA's weaker criteria shown in Table 2 do not protect designated uses of water based on sound scientific rationale, and even if this were true for some toxics in some areas of the Bay, the weaker criteria are not necessary to allow important economic or social development. Therefore, revision of water quality standards by adopting these criteria would not meet the tests set forth by 40 CFR §131.11(a)(1) and §131.12 and the Clean Water Act provisions these regulations implement. Further, incorporating schedules allowing polluters to harm fishing and aquatic life in water quality standards and effluent limits is improper, and there is no legitimate need for schedules allowing degradation of water quality and restricting public participation to be in permits instead of putting them in administrative enforcement orders as is done today. Thus EPA's proposal may, by failing to provide equal protection for people of color who fish for food and unfairly restricting public participation, also conflict with the Executive Order on environmental justice and civil rights law.

III. LIST OF ATTACHMENTS FOR SUBMISSION INTO EVIDENCE

1. U.S. Geological Survey, 1992. Letter from Samuel N. Luoma, Ph.D., to Seven R. Ritchie, Executive Officer, Regional Water Quality Control Board. August 24, 1992.

2. Karras, 1992. Comparison of copper in waters of the southern reach of San Francisco Bay and ten other estuaries. Communities for a Better Environment (CBE). July, 1992.

3. San Francisco Estuary Institute, 1997. Regional monitoring program for trace substances 1995 annual report. Excerpts including pages 105, 3, and A-17 through A-24 showing the percentage of sediment bioassays (larval bivalve and *Eohaustorius* tests) that were toxic (less than 80% of control value) at RMP stations from 1991-1996, sampling stations, and dissolved and total metal, and PAH concentrations in San Francisco Bay waters.

4. Spies et al., (2 papers), 1988: Effects of organic contaminants on reproduction of the starry flounder Platichthys stellatus in San Francisco Bay, I., Hepatic contamination and mixed-function oxidase (MFO) activity during the reproductive season. Marine Biology 98: 181-189; and II. Reproductive success of fish captured in San Francisco Bay and spawned in the laboratory. Marine Biology 98: 191-200. Excerpt including abstracts.

5. Kopec and Harvey, 1995. Toxic pollutants, health indices, and population dynamics of harbor seals in San Francisco Bay, 1989-1992. Moss Landing Marine Laboratories Technical Publication 96-4. ISSN 1088-2413. October, 1995. Excerpt regarding PCBs levels as compared to European seals in which a disease epidemic and population crash was observed.

6. Cal. EPA, 1994. Health advisory on catching and eating fish, interim sport fish advisory for San Francisco Bay. December, 1994.

7. California Department of Health Services, 1994. Health Warnings. Contained in the 1994 California Hunting Regulations for Resident and Migratory Game Birds issues by the state's Fish and Game Commission, Sacramento, Calif. Excerpt including health warning for selenium.

8. Previously unpublished data from a 1993-4 survey of 500 anglers using South and Central San Francisco Bay by Communities for a Better Environment-SAFER!; Save San Francisco Bay Association, 1995 (excerpt); West, 1992; West et al., 1992; Peterson et al., 1994; and USEPA, 1994.(excerpt of a draft report discussing and citing work by EPA, Wolfe and Walker (1987), Svensson (1991) and others. Includes analysis of the evidence..

9. EPA, 1990. Decision of the United States Environmental Protection Agency on listing under section 304(l) of the Clean Water Act regarding the state of California. Excerpt including pages listing San Francisco Bay waters as a "toxic hot spot."

10. California State Water Resources Control Board, 1991. California Enclosed Bays and Estuaries Plan; water quality control plan for enclosed bays and estuaries in California. 91-13 WQ. April, 1991. Excerpt including adopted water quality criteria and definition of terms.

11. California Regional Water Quality Control Board, San Francisco Bay Region, 1986. Water Quality Control Plan, San Francisco Bay Region (2). December, 1986. Excerpt including adopted water quality criteria (objectives) for toxic pollutants in the Bay, and segmentation scheme.

12. California Regional Water Quality Control Board, San Francisco Bay Region, 1992. Resolution No. 92-128, adopting an amendment to the water quality control plan and requesting approval from the State Water Resources Control Board. October 21, 1992; and State Water Resources Control Board Workshop Session, April 6 and 7, 1994. Consolidation of the amendments to the water quality control plan for the San Francisco Bay basin regarding a site-specific water quality objective and plan of implementation for copper and addressing nickel. Excerpts including site specific water quality criterion for total copper in San Francisco Bay, and showing that the State Water Resources Control Board staff found "the technical aspects of the site-specific copper objective are valid."

13. San Francisco Estuary Project, 1992. State of the estuary, a report on conditions and problems in the San Francisco Bay/Sacramento-San Joaquin Delta estuary. Prepared under cooperative agreement #CE-009486-02 with the U.S. Environmental Protection Agency, by the Association of Bay Area Governments, Oakland, CA. June, 1992. Excerpt including Table 18 (page 163): Pollutants of concern in the Bay/Delta estuary.

14. Presentation by Dr. William Farland, EPA, at the May 7, 1997 Workshop on dioxins held by the Regional Water Quality Control Board, San Francisco Bay Region in the Hearing Room of the BART headquarters building, Oakland, CA. Excerpt from the RWQCB's tape of the workshop discussing toxicity equivalents data from mechanistic, laboratory and field analyses.

15. Flegal et al., 1990. Trace element cycles in the San Francisco Bay estuary: results from a preliminary study in 1989-1990. Final report to the State Water Resources Control Board. Institute of Marine Sciences, U.C. Santa Cruz. Excerpt showing dissolved and total metal concentrations measured in San Francisco Bay waters.

16. California Regional Water Quality Control Board, San Francisco Bay Region, 1995. Contaminant levels in fish tissue from San Francisco Bay. Final draft report. Excerpt including data from toxic pollutant analyses of fish tissue samples from S.F. Bay. December, 1994.

17. USEPA, 1992. Comments on the data presented in the Hansen Report. Includes cover letter from Maria Rea, Chief, Water Quality Standards Section, to Steven R. Ritchie, Executive Officer, Regional Water Quality Control Board, San Francisco Bay Region. July 15, 1992.

18. California State Water Resources Control Board, 1992. Memorandum from Michael Perrone, Ph. D., to Lynn Suer, Ph.D., Regional Water Quality Control Board, re: Review of draft final report entitled "Development of site specific criteria for copper for San Francisco Bay." June 29, 1992.

19. California Department of Fish and Game, 1992. Comments on the Draft Final Report Entitled "Development of site-specific criteria for copper for San Francisco Bay." Letter from John Turner, DFG, to Steven R. Ritchie, RWQCB. July 14, 1992.

20. Comparison of dioxin-like toxicity equivalents in San Francisco Bay fish tissue: 2,3,7,8-TCDD v. seventeen 2,3,7,8-substituted dioxins and furans. Table using data from Attachment 16, and analysis by CBE.

21. California State Water Resources Control Board, 1997. Staff technical report, Division of Water Quality, Petitions of CBE, San Francisco BayKeeper, and Tosco Corporation for review of Order No. 95-138 of the San Francisco Bay Regional Water Quality Control Board. Office of Chief Counsel [OCC File Nos. A-983 and A-983(A)].